

## Testing the Construct Validity of audit quality measurement model

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### Abstract:

The current study aimed to test the construct validity of model for measuring the quality of audit. To achieve this aim, the researchers used a principal component analysis (PCA) through the SPSS program and then a confirmatory factor analysis (CFA) through Amos program (Amos 21.0). The study population represents the Libyan external auditors who obtained a license to practice the profession from the Libyan Accountants and Auditors Association (LAAA). The findings of the study verified the construct validity of the model as a reliable scale for measuring the quality of audit.

**Keywords:** quality, profession, audit quality.

اختبار الصلاحية الإنشائية لنموذج قياس جودة المراجعة  
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الملخص:

تهدف الدراسة إلى اختبار صلاحية بناء نموذج لقياس جودة المراجعة، ولتحقيق هذا الهدف، استخدم الباحثون تحليل المكونات الرئيسية (PCA) Principal Component Analysis من خلال برنامج (SPSS) ومن ثم استخدام التحليل العاملي التوكيدي (CFA) Confirmatory Factor Analysis من خلال برنامج (Amos 21.0). وتمثل مجتمع الدراسة في المراجعين الخارجيين الليبيين الحاصلين على ترخيص لمزاولة

المهنة من نقابة المحاسبين والمراجعين القانونيين الليبية. وأكدت نتائج الدراسة صحة البناء للنموذج كمقياس موثوق به لقياس جودة المراجعة.

## 1. Introduction:

The importance of audit quality lies in the fact that external users of financial statements expect the output of the audit process, which is represented by the auditor's report that reflects the quality of audit and the credibility of the information provided. This is because they rely on these statements in making their decisions and drawing their policies. Therefore, quality is a prerequisite for all the beneficiaries of the audit services.

There is no consensus about one unified and referential concept of the quality of audit among most previous studies. Previous researchers adopted many approaches to defining this concept. However, recent studies have relied upon the approach to corporate governance mechanisms as determinants of the concept of audit quality through several variables associated with or related to activating the role of audit committees and supporting their responsibilities in overseeing the process of auditing and controlling its quality (Lin. J.W and Hwang. M. I, 2010; Lowensohn. S; et al.2007).

The definition of quality of auditing offered by (De Angelo. L. E, 1981, p186)is regarded as one of the most widely accepted definitions among many researchers in the field of auditing. He defined it as "the possibility of the auditor to discover a breach in the accounting system or twist in the preparation of financial reports for the client". In terms of measuring the quality of auditing, (Krishnan. J and Schauer. P. C, 2000) measured its range based on conformity with generally accepted accounting principles (GAAP). They also adopted professional standards as an input to determine the concept of audit quality and its measurement. In addition, other few studies (e.g., O'Keefe. T and Westort. P, 1992; J. Debrac, 2014) found that the audit quality

increases when the audited company has a high level of knowledge.

As pointed out by (Gunny. K; et al., 2007), the auditor's or auditing company's industrial experience has a positive relationship with the audit quality. This was supported by the findings of (Cameran. M; et al., 2015) study indicating that the audit team's joint educational backgrounds improves the quality of auditing, which increases the ability to compete with others. This was also confirmed by (Bashir.F,2013) who found that all auditors' and clients attention was directed towards the quality of the auditing process as a weighted factor through which a distinction is made between the auditing of companies and that of offices.

As reported by both (Low, 2004) and (Bashir. F, 2013), the audit quality is measured in accordance with the characteristics associated with its work and tasks. This was confirmed by (Manita. R and Chemangui. M, 2007). Therefore, the current study relied on (De Angelo. L. E, 1981) definition of audit quality and for its measurement, the study took into account several factors, which were adopted by a number of several previous studies as dimensions of its measurement. These factors are independence of the external auditor, training and continuing education, work experience, audit planning, supervision of auditor assistants, professional bodies and professional standards (Jaffar. N and Alias. N, 2005) ; (Bashir. F, 2013); (Tuwajri and Nafabi, 2008).

## 2. The aim of the study:

This study aims to raise and develop the performance of the auditing profession, especially in light of the transformations and developments taking place in Libya. This is done by shedding light on an important and vital topic, which is audit quality indicators from the point of view of practitioners in Libya. As quality has several measures that may vary from one environment to another and from time to time. Models have more ability to

match the behavior of variables in reality in their interaction and intersection

The study also aimed to determine these indicators by testing the structural validity of the audit quality measurement model for Libyan external auditors who have a license to practice the profession from the Libyan Association of Accountants and Auditors (LAAA).

### 3. Method.

#### 3.1. Study population and sampling design:

##### 3.1.1. study Population:

The population of this study is comprised of Libyan Association of Accountants and Auditors (LAAA). The total current LAAA numbers was not available at the time when the empirical study was being carried out, (Because auditors' lists have not updated for years). Therefore, the researchers had to rely on latest list of the LAAA members. According to LAAA the total number of members in February 2016 was 1,206. The directory lists the names of LAAA members according to their audit offices, and shows addresses and telephone of audit offices.

##### 3.1.2. Sampling Design

Several issues must be considered when the sample size is determined, which include (1) the response rate that would determine the final number of usable cases, (2) the statistical requirements and (3) manageability of the administration of the survey and cost. Sekaran (2003, p. 295) indicated some researcher's guidance in identifying the sample size: (1) sample size larger than 30 and less than 500 are appropriate and (2) in multivariate studies, it should be at least ten times as large as the variables' number.

It is logical to find various reasons why some of LAAA's members are unable to answer the questionnaire, such as too busy or tight schedule; some returned questionnaires are unsuitable for analysis, and some LAAA's members could not be reached either due to wrong address or office moved elsewhere. Furthermore, some LAAA's members had stopped practicing the profession or had

changed their audit office and they had not yet notified the LAAA of those events. For above reasons and also as a result to Libya situation before and during the field study, 500 LAAA's member is the target number of questionnaires for distribution. However, only 394 questionnaires were returned, which accounted for nearly 79%. For those incomplete returned questionnaires, they were not used in this study as they missed important information. Therefore, the useable questionnaires used for analysis in this study were 356.

#### 4. Statistical analysis:

##### 4.1. Principal Component Analysis:

Before using confirmatory factor analysis (CFA) to test the model of audit quality, this study used an exploratory factor analysis with the aim of ensuring that the items represent each factor or dimension of the measurement and that these dimensions represent the underlying factor, which is the audit quality.

Based on what was stated in (Brown, 2006; Field, 2006; Hair, 2006; Kline, 2011), the items with loadings of less than (0.45) and those items which had loadings in more than factor (Complex Structure) were removed. Moreover, the researchers adopted an orthogonal rotation method for the independence of the factors from each other. The minimum root for the underlying factors was (1:00), and based on the results of the analysis, it can be seen from Table (1) and Figure (1) that the underlying factor is represented by several dimensions and each after is represented by a number of sufficient items (3 items and more than 3).

They were also labeled according to their theoretical content as the first factor represented continuous education and training as well as international standards, while the second dimension stands for professional experience and with respect to the third dimension, it is for audit planning, and the fourth is for supervision of auditors' assistants. For the fifth dimension, it contained professional organizations, and regarding the sixth dimension, it stands for the independence of the external auditor.

## 4.2 Confirmatory Factor Analysis:

In order to test the model of Audit Quality-(AQ) the confirmatory factor analysis (CFA) model-fitting program is used. The model fit is evaluated by using four indices of the model goodness-of-fit: (1) the comparative fit index (CFI); (2) the root mean square error approximation (RMSEA) between (0.08) to (0.10) indicates a mediocre fit Browne and Cudeck (1993) and would not employ a model a (RMSEA) greater than 0.1 ( $>0.1$ ) (MacCallu -um et al., 1996); (3) The minimum value of the discrepancy between the observed data and the hypothesised model divided by degrees of freedom (CMIN/DF) or normed chi-square, (Marsh and Hocevar, 1985); (4) the chi-square statistics McDonald and Marsh (1990).

## 4.3. Construct Validity and Reliability:

The employment of factor loading composite reliability (CR) According to (Hair, et al 2006) and average variance extracted (AVE) to determine the convergent validity if it equals to or greater than 0.5 ( $\geq 0.5$ ) and the (AVE) reading values should be greater than 0.5 ( $\geq 0.5$ ) (Fornel and Larker, 1981). Also, composite reliability equals to or greater than 0.7 ( $\geq 0.7$ ) if were recommended (Hair et al. 2006).

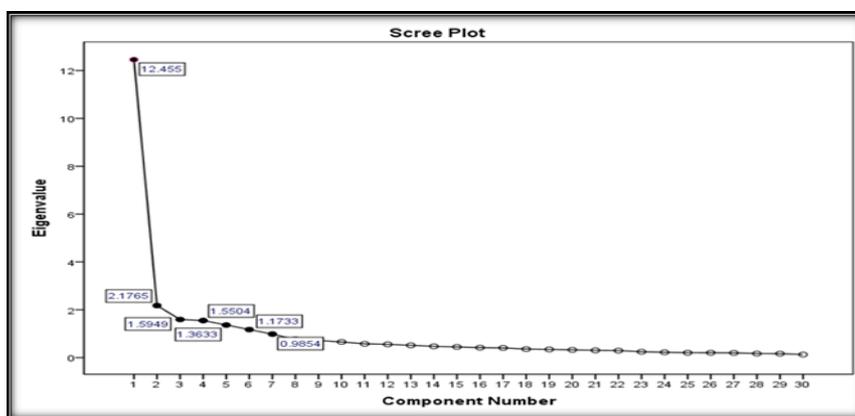


Figure 1: (Audit Quality-AQ), model with Six-dimension-test Eigen

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**Table 1: Number of basic components to measure (Audit Quality-AQ)model.**

	1	2	3	4	5	6
Q1						.580
Q2						.729
Q3						.670
Q5	.573					
Q6	.608					
Q7	.522					
Q8	.451					
Q10			.543			
Q11			.760			
Q12			.735			
Q13			.754			
Q14			.689			
Q15		.654				
Q16		.805				
Q17		.674				
Q18		.715				
Q19		.669				
Q20				.818		
Q21				.762		
Q22				.627		
Q23				.781		
Q24					.780	
Q25					.716	
Q26					.833	
Q27					.680	
Q29	.706					
Q30	.698					
Q31	.801					
Q32	.826					
Q33	.482					

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 6 iterations.

## 5. Results:

### 5.1. The Modified Model:

Figure (2) displays the results obtained through a (CFA) regarding the developed model for measuring Audit Quality-AQ, Based on the results, this proposed model is free of the illogical correlation since it reaches or exceeds (1). This also implies that the (CFA) shows no problem regarding testing the validity of this model (AQ) that comprises Six dimension. Moreover, Figure (2) and Table (2) demonstrate that goodness of fit between the proposed model and the data exceeded the T-value, which is evidenced by the value of the Chi-Square (1325.806) and the degree of freedom was (390) as well as the level of significance (P=0.000). Moreover, the root mean square error of approximation (RMSEA) was (0.082), which is higher than (0.080).

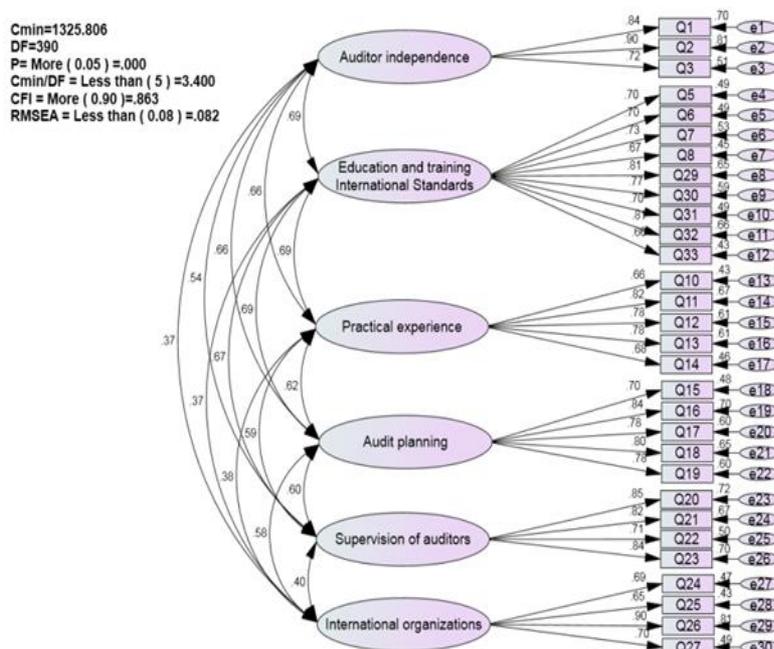


Figure 2: (Audit Quality-AQ), model with Seven- dimension after the amendment model

The results also show that the normative Chi-Square (Chi-Square) was (3.400), which is lower than (5) and the value of relative strength index (CFI) was (0.863), which is even less than (0.90). This suggests the need for modifying the model (AQ) of this study.

In order to modify this model, the researchers followed two steps: separation of the second factor, according to (Jaffar. N and Alias. N, 2005; Tuwaijri and Nafabi, 2008; Bashir. F, 2013), into two factors: the Education and training and second International Standards, which were dealt with as two separate factors. The second step was deleting four items (Q8, Q14, Q15, & Q33) where the ratio of saturation or loading these items was the least compared to other items and to what Amos confirmed by analysis of Amos. The following figure 2 shows the (Audit Quality-AQ) model with Seven- dimension after the amendment.

**Table 2: index value of AQ model before and after modification**

indicators consistency	index value before modification	index value after modification	Function value on the quality of conformity
Cmin	1325.806	827.098	---
Df	390	278	---
P-value	0.000	0.000	Non
Cmin/Df	3.400	2.975	Less than (5)
CFI	0.863	0.906	More (0.90)
Rmse	0.082	0.075	Less than (0.08)

### 5.2 Confirmatory Factor Analysis of the Audit Quality model:

The results of the goodness-of-fit of the final revised of the Audit Quality-AQ model showed that normed chi-square (CMIN/DF) was (2.975) the CFI was (0.906) and RMSEA was (0.075). Figure (3) shows the adequacy of the final revised of the (Audit Quality-AQ) model.

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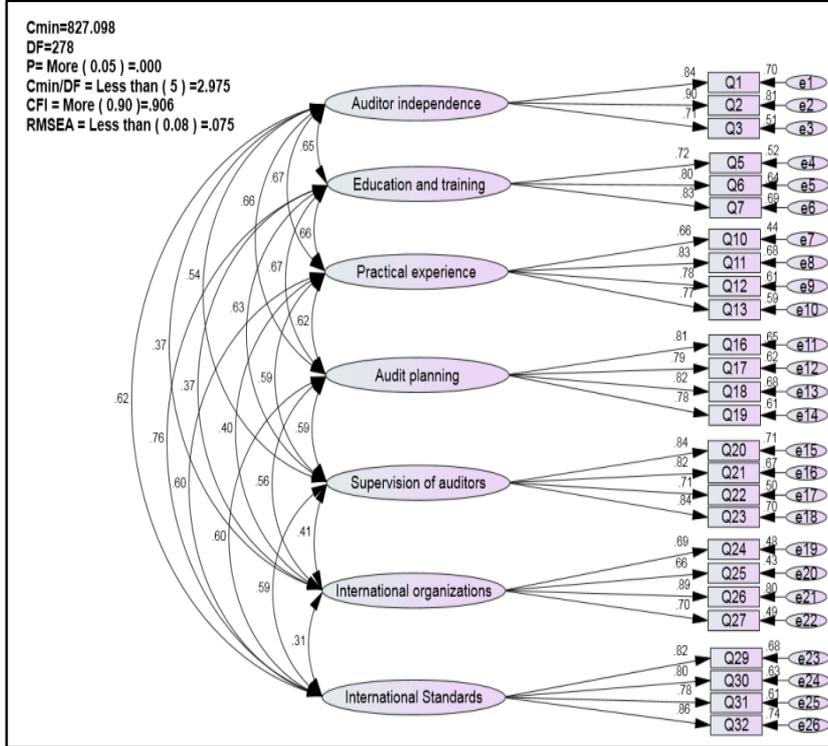


Figure 3: (Audit Quality-AQ), model with Seven- dimension after the amendment model.

### 5.3. Construct Validity and Reliability for (Audit Quality-AQ):

Based on the results, loading for the parameters of this factor was in the range of (0.66 to 0.90), with all parameters, which were estimated above 0.5 ( $\geq 0.5$ ). Moreover, the reliability was higher than 0.7 ( $\geq 0.7$ ) as it ranged from (0.940 to 0.943). The AVE was (0.55 to 0.67), which was also higher than 0.5 ( $\geq 0.5$ ). As a result, both reliability and validity were achieved by all factors of the proposed model. Generally, the all factors of the model was fit and fulfilled the constructed, as shown in Table (3).

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**Table 3: Construct Validity and Reliability of Audit Quality-AQ model.**

dimension	Items Code	reliability	estimate	S. E.	C. R.	P	Loading	R	AVE
Auditor independence	Q-1	0.940	0.908	0.046	19.358	0.000	0.84	0.70	0.67
	Q-2	0.940	1.000	-	-	-	0.90	0.81	
	Q-3	0.941	0.779	0.050	15.475	0.000	0.71	0.51	
Education and training	Q-5	0.940	0.854	0.059	14.420	0.000	0.72	0.52	0.61
	Q-6	0.940	0.985	0.060	16.202	0.000	0.80	0.64	
	Q-7	0.940	1.000	-	-	-	0.83	0.69	
Practical experience	Q-10	0.941	0.866	0.069	12.396	0.000	0.66	0.44	0.62
	Q-11	0.940	0.984	0.062	15.851	0.000	0.83	0.68	
	Q-12	0.940	1.000	-	-	-	0.78	0.61	
	Q-13	0.941	0.988	0.067	14.616	0.000	0.77	0.59	
Audit planning	Q-16	0.940	0.998	0.058	17.850	0.000	0.81	0.65	0.64
	Q-17	0.940	0.930	0.056	16.946	0.000	0.79	0.62	
	Q-18	0.940	1.000	-	-	-	0.82	0.68	
	Q-19	0.940	0.941	0.057	16.319	0.000	0.78	0.61	
Supervision of auditors	Q-20	0.940	1.000	-	-	-	0.84	0.71	0.64
	Q-21	0.940	0.907	0.050	17.971	0.000	0.82	0.67	
	Q-22	0.940	0.858	0.058	14.682	0.000	0.71	0.50	
	Q-23	0.940	0.978	0.052	18.520	0.000	0.84	0.70	
International organizations	Q-24	0.943	0.760	0.055	13.829	0.000	0.69	0.48	0.55
	Q-25	0.942	0.725	0.055	13.036	0.000	0.66	0.43	
	Q-26	0.942	1.000	-	-	-	0.89	0.80	
	Q-27	0.942	0.765	0.054	14.025	0.000	0.70	0.49	
International Standards	Q-29	0.940	0.960	0.050	18.904	0.000	0.82	0.68	0.66
	Q-30	0.940	0.943	0.052	17.890	0.000	0.80	0.63	
	Q-31	0.941	0.881	0.050	17.376	0.000	0.78	0.61	
	Q-32	0.940	1.000	-	-	-	0.86	0.74	

#### 5.4. Fornell -Larcker Criterion:

In this study, Fornell -Larcker Criterion, suggesting that the AVE for each dimension of the main scale would be higher than the (SV) of all relations was used for the purpose of testing the predictive validity (discrimination) among the dimensions of the proposed model. This is shown in Table (4) presenting the results of the relations among the Seven dimension of the model.

Based on the above results, the SV among the Six dimensions is resulted from multiplying the value of correlation by itself. Moreover, the results demonstrate the AVE for every dimension of the proposed model was higher than the SV among all the dimensions. However, one factor was less than the highest value in

the covariance, but was Very close and higher (0.50), This indicates the abovementioned Fornell -Larcker Criterion was fulfilled or met by the proposed model as the Seven dimensions achieved the required predictive validity.

**Table 4: Covariance and the contrast between the extracted five-factor matrix Audit Quality-AQ models**

dimension Abbreviation	A.I	E.I	P.E	A.P	S.A	I.O	O.S
A.I	0.67	-	-	-	-	-	-
E.I	0.42	0.61	-	-	-	-	-
P.E	0.44	0.43	0.62	-	-	-	-
A.P	0.43	0.44	0.38	0.64	-	-	-
S.A	0.29	0.39	0.34	0.34	0.64	-	-
I.O	0.13	0.13	0.16	0.13	0.16	0.55	-
O.S	0.38	0.57	0.36	0.36	0.34	0.09	0.66

## 6. Conclusion:

The present study aimed to test the construct validity of a model for measuring the audit quality. The model comprises the audit quality as a factor underlying several factors are in (the independence of the external auditor, training and continuing education, work or professional experience, audit planning, supervision of auditor assistants, professional bodies and professional standards adopted from previous studies, including (Jaffar. N and Alias. N,2005) ;(Bashir. F,2013); (Tuwajiri and Nafabi,2008). To achieve this aim, the researchers used exhortatory analysis through a PCA and CFA) through Amos program (Amos 21.0). To test the construct validity of the model that can be used for measuring the quality of audit, and based on the results of the analysis and outputs from the Amos program displayed in Figure (2) and Table (2), there is no goodness of fit between the model and the data, which required modifying the model. However, after amendments were made to the model as illustrated by Figure (3) and Tables (3), (4), it was found that there was goodness of fit between the model and the data based on indices of goodness of fit. Moreover, the average variation extracted (AVE) value for all

factors was higher than (50). This means that the model is characterized by both convergence and divergence. Therefore, the model proposed in the current study is valid to be used for measuring the audit quality.

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